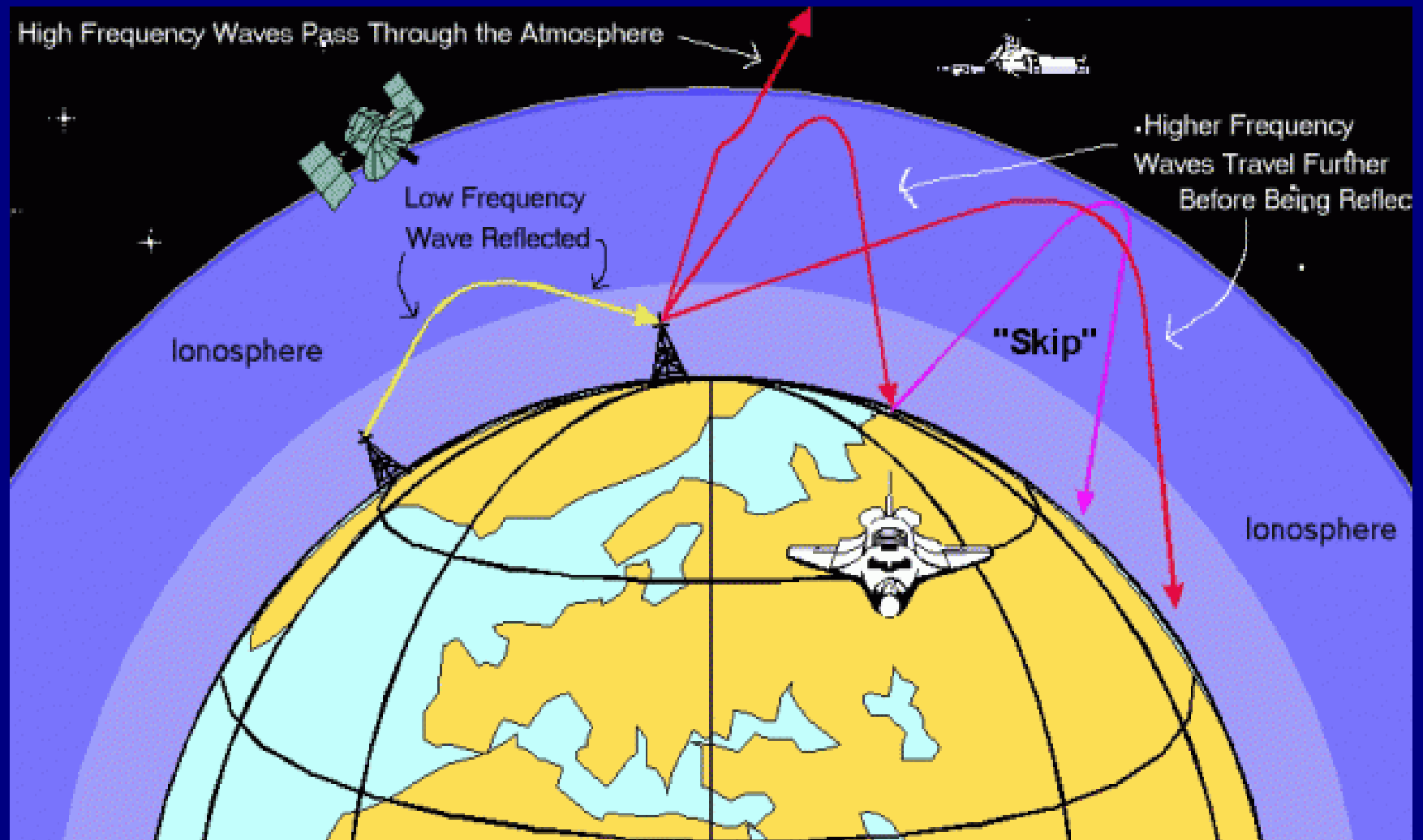


Reverse Beacon Network Experiment

Ionospheric Radio Propagation



Amateur Radio (Ham Radio)

- Local and Global
 - In nearly every country on Earth
 - Licensed, with privileges
 - Diverse
 - All ages, backgrounds, interests
 - Makers, electronics hobbyists, communicators
 - Voice, video, wifi, digital (CW, RTTY, other modes)
- Activities
 - DX, rag chews
 - Clubs, contests, “foxhunts,” special events
 - Emergency communications
 - Satellite, aircraft, high altitude balloons
 - Electronics, antenna design, RADIO PROPAGATION

Ham Radio Jargon

- Contact – An exchange of information via radio
- DX – A distant station; or a contact with a distant station
- CW - Continuous wave radio transmissions in international morse code (the oldest digital text format)
- RTTY – Radio teletype (a very old digital text format)
- Spot – A formatted description of a received radio signal (date/time, frequency, call sign and signal strength)

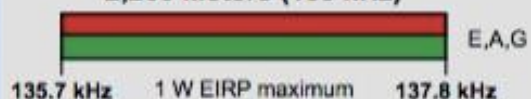
US Amateur Radio Bands

US AMATEUR POWER LIMITS

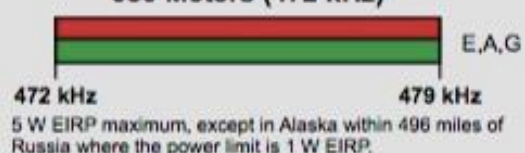
FCC 97.313 An amateur station must use the minimum transmitter power necessary to carry out the desired communications. (b) No station may transmit with a transmitter power exceeding 1.5 kW PEP.

On March 28, 2017, the Federal Communications Commission adopted rules that will allow Amateur Radio access to 472-479 kHz (630 meters) and to 135.7-137.8 kHz (2,200 meters). However, amateurs cannot use these frequencies until 30 days after the Report and Order is published in the Federal Register and the final procedures for registering stations with the Utilities Telecoms Council (UTC) have been approved and announced. At the time this chart was created, the Report and Order had not been published and the UTC online registration site is not yet available. Follow ARRL news for further information. New charts will be published at www.arrl.org/graphical-frequency-allocations when the bands are fully available for use.

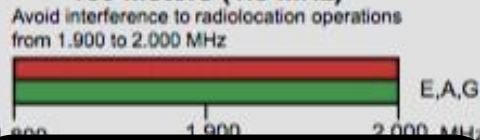
2,200 Meters (135 kHz)



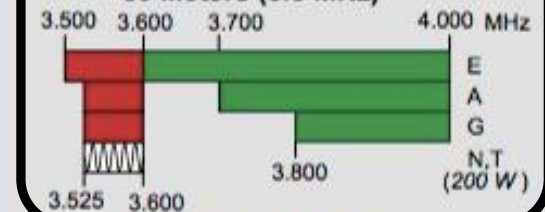
630 Meters (472 kHz)



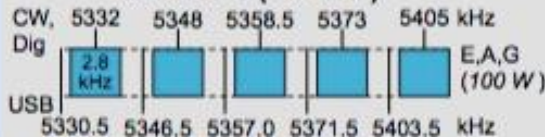
160 Meters (1.8 MHz)



80 Meters (3.5 MHz)

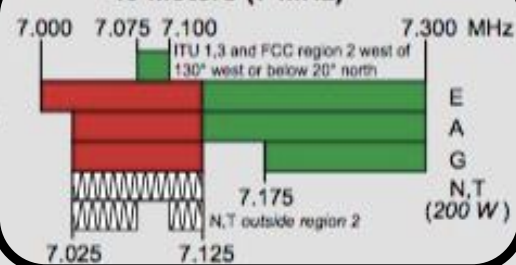


60 Meters (5.3 MHz)



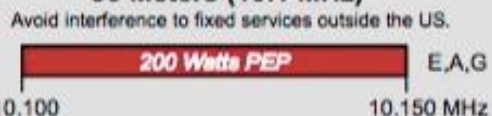
General, Advanced, and Amateur Extra licensees may operate on these five channels on a secondary basis with a maximum effective radiated power (ERP) of 100 W PEP relative to a half-wave dipole. Permitted operating modes are CW, 5332, 5348, 5358.5, 5373, 5405 kHz

40 Meters (7 MHz)

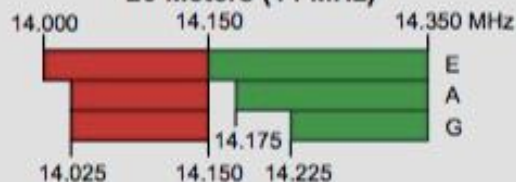


See Sections 97.305(c), 97.307(f)(11) and 97.301(e). These exemptions do not apply to stations in the continental US.

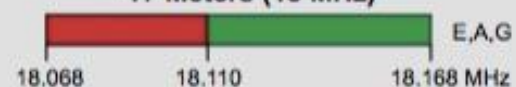
30 Meters (10.1 MHz)



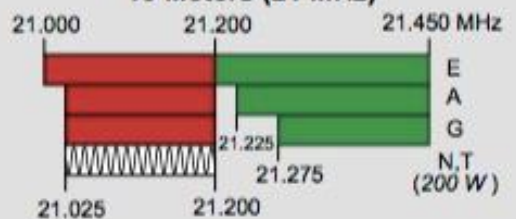
20 Meters (14 MHz)



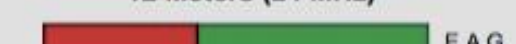
17 Meters (18 MHz)



15 Meters (21 MHz)



12 Meters (24 MHz)



Effective Date for
2,200 and 630 Meters
to be announced



ARRL The national association for
AMATEUR RADIO®

KEY

Note:
CW operation is permitted throughout all amateur bands.

MCW is authorized above 50.1 MHz, except for 144.0-144.1 and 219-220 MHz.

Test transmissions are authorized above 51 MHz, except for 219-220 MHz

- = RTTY and data
- = phone and image
- = CW only
- = SSB phone
- = USB phone, CW, RTTY, and data
- = Fixed digital message forwarding systems only

E = Amateur Extra
A = Advanced
G = General
T = Technician
N = Novice

See **ARRLWeb** at www.arrl.org for detailed band plans.

ARRL
We're At Your Service

ARRL Headquarters:
860-594-0200 (Fax 860-594-0259)
email: hq@arrl.org

Publication Orders:
www.arrl.org/shop
Toll-Free 1-888-277-5269 (860-594-0355)
email: orders@arrl.org

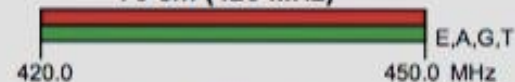
Membership/Circulation Desk:
www.arrl.org/membership
Toll-Free 1-888-277-5269 (860-594-0338)
email: membership@arrl.org

Getting Started in Amateur Radio:
Toll-Free 1-800-326-3942 (860-594-0355)
email: newham@arrl.org

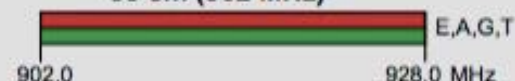
Exams: 860-594-0300 email: vec@arrl.org

*Geographical and power restrictions may apply to all bands above 420 MHz. See *The ARRL Operating Manual* for information about your area.

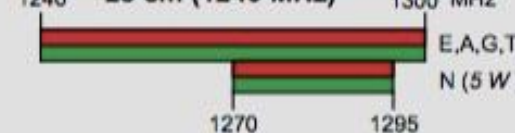
70 cm (420 MHz)*



33 cm (902 MHz)*



23 cm (1240 MHz)*



All licensees except Novices are authorized all modes on the following frequencies:

2300-2310 MHz	10.0-10.5 GHz ±	122.25-123.0 GHz
2390-2450 MHz	24.0-24.25 GHz	134-141 GHz
3300-3500 MHz	47.0-47.2 GHz	241-250 GHz

Beacons and Reverse Beacons

- Beacon
 - Examples: lighthouse or emergency alert siren (e.g., tornado, tsunami warnings), radio transmitter
- Radio Beacon
 - Automated or manual radio transmissions
 - Purpose: An aid for communicators to determine radio propagation conditions
- Reverse Beacon (or Skimmer)
 - Automated HF radio receiver and computer system for logging and reporting radio beacon spots

Reverse Beacon Network

A network of automated radio receiver stations that listen to Amateur Radio transmissions and report what stations they hear, when and how well (signal strength).

These reception reports are called "spots."

RBN stations collect spots and send them back to central databases where they are displayed on the RBN website.

Our team will be operating one of these RBN sites to conduct radio science.

References

- www.reversebeacon.net -> About
- Robert Capon W3DX, Reverse Beacon Network, 14 February 2017
<https://www.youtube.com/watch?v=-fwilBr1WoU>



/ 160m / 80m / 40m / 30m / 20m / 17m / 15m / 12m / 10m / 6m / 2m

world wide / zoom to US / zoom to Europe / zoom to North Atlantic

show/hide my last filters

no filter selected, showing all spots

search spot by callsign

rows to show: 10

de	dx	freq	cq/dx	snr	speed	time
DL6ZB	SM2YIZ	14014.4	CW CQ [LoTW]	27 dB	25 wpm	1430z 12 Jul
K2MFF-3	W3P	7026.0	CW CQ	8 dB	25 wpm	1430z 12 Jul
HA6PX	SM2YIZ	14014.4	CW CQ [LoTW]	24 dB	26 wpm	1430z 12 Jul
DF4XX	SM2YIZ	14014.4	CW CQ [LoTW]	9 dB	26 wpm	1430z 12 Jul
SV1CDN	SM2YIZ	14014.5	CW CQ [LoTW]	17 dB	25 wpm	1430z 12 Jul
SK3W	I2WEQ	14050.0	CW CQ [LoTW]	11 dB	16 wpm	1430z 12 Jul
OH6BG	DL0SLS	14016.7	CW CQ	14 dB	25 wpm	1430z 12 Jul
OH6BG	VU2JXL	14020.1	CW CQ [LoTW]	12 dB	20 wpm	1430z 12 Jul
IK3STG	LZ284SKD	14012.0	CW CQ	20 dB	28 wpm	1430z 12 Jul
SK3GW	K1MBF	14034.5	CW CQ	12 dB	13 wpm	1429z 12 Jul

options:

[show/hide](#)

news

[RBN blog: stay tuned!](#)

we have 132 skimmers online

skimmers online:

3B8CW - 20m

7L4IOU - no spot last 15min

9M2CNC - 20m

9M2ZAK - no spot last 15min

9V1RM - no spot last 15min

AA4VV - 40m, 30m, 20m

AC0C - 40m, 30m, 20m

BD4WN - no spot last 15min

BG8NUD - 20m

BH4RRG - no spot last 15min

DF4XX - 20m

DJ9IE - 40m, 30m, 20m, 17m

DK0TE - 40m, 30m, 20m

DK3UA - 40m, 30m

DK8NE - no spot last 15min

DK9IP - 40m, 20m

DL3KR - 40m, 20m

DL6ZB - 20m

DL8LAS - 40m, 20m

DL9GTB - 80m, 40m, 20m

DO4DXA - 40m, 30m, 20m, 10m

DQ8Z - 40m, 30m, 20m, 17m

EA5WU - 30m, 20m, 17m

EA6VQ - no spot last 15min

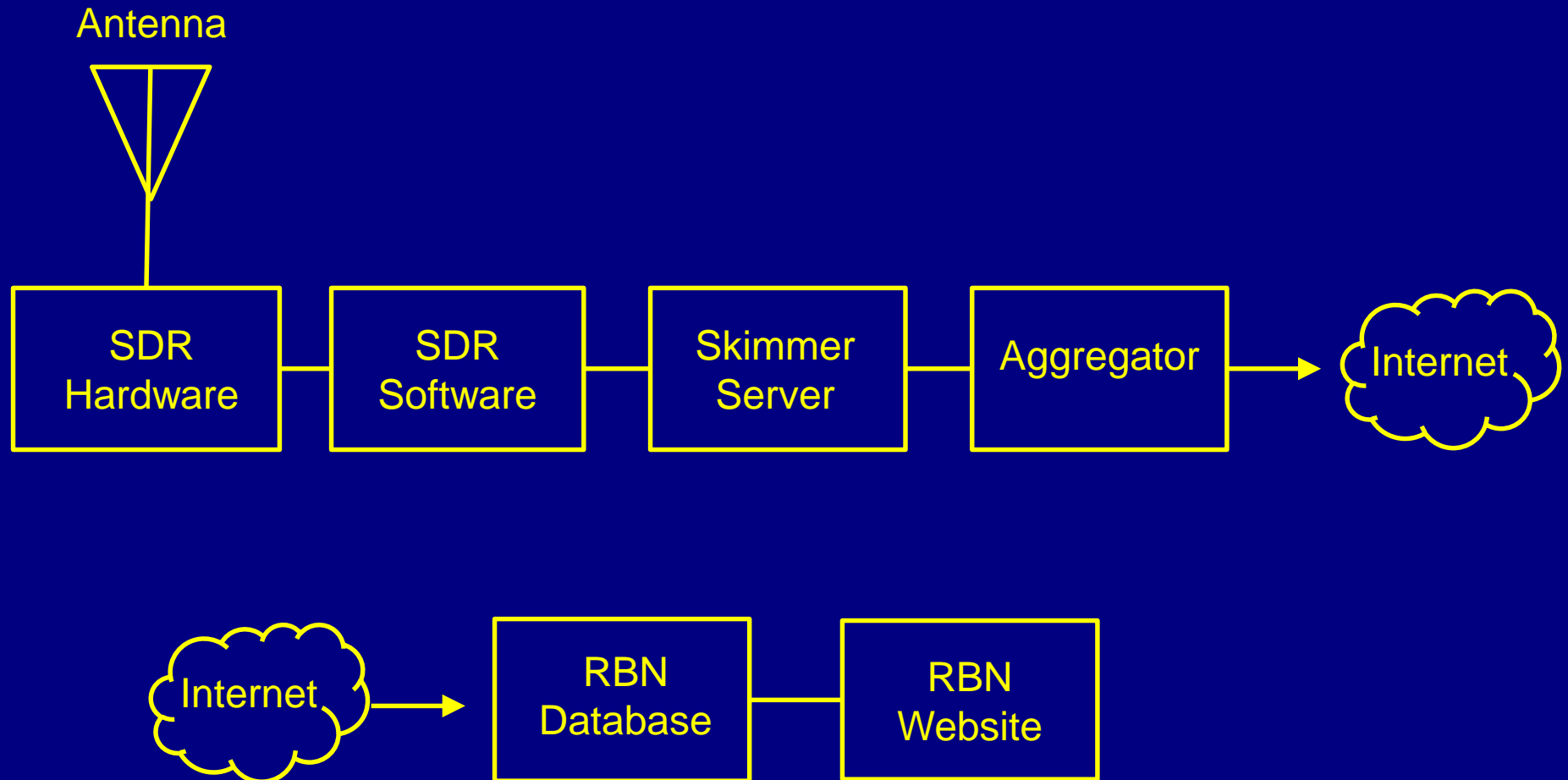
EA8DBM - no spot last 15min

EC1CT - no spot last 15min

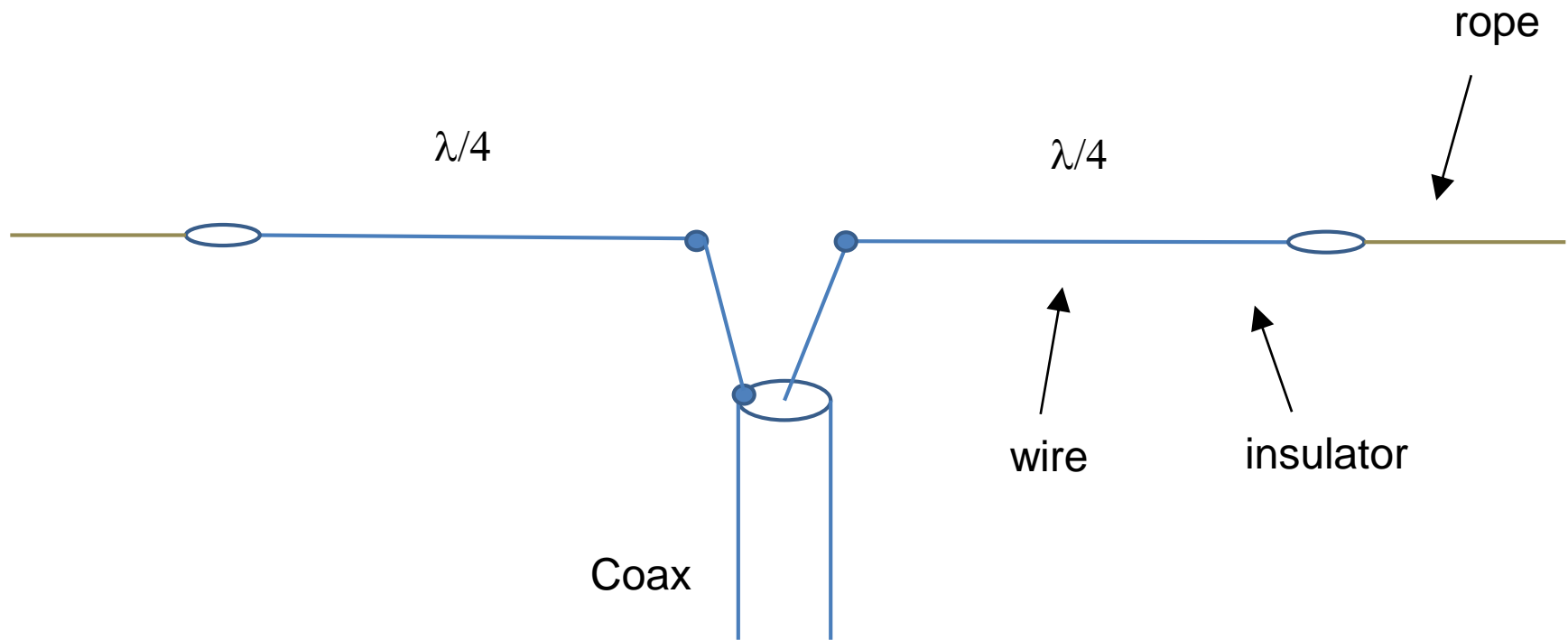
EI7HQB - 20m

F4KJL - 6m

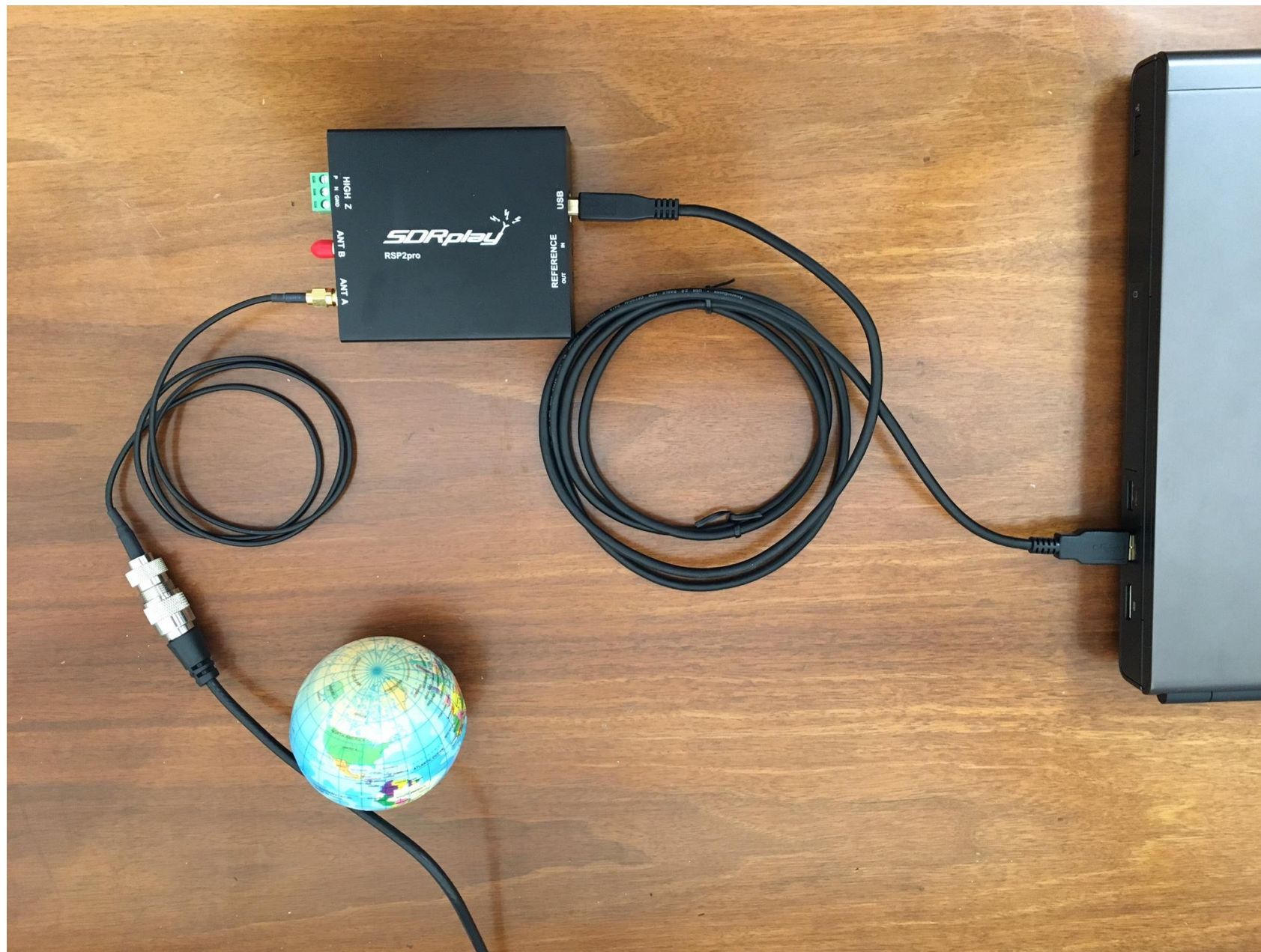
Reverse Beacon Node System Data Flow



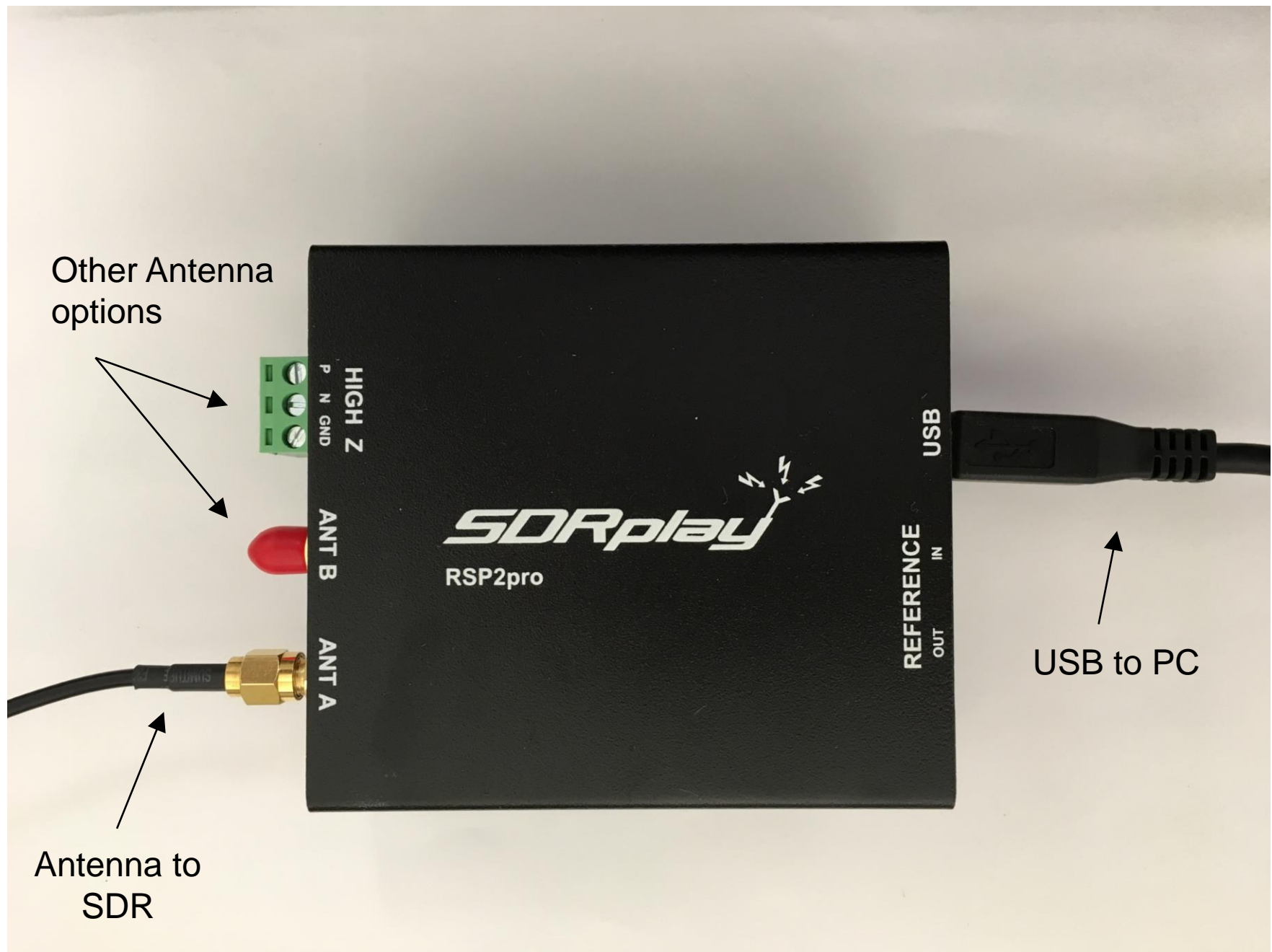
Half Wave Dipole Antenna



Software Defined Radio



Software Defined Radio



Links

U.S. Amateur Radio Frequency Bands

- <http://www.arrl.org/graphical-frequency-allocations>

No Nonsense Amateur Radio Study Guides

- <http://www.kb6nu.com/study-guides/>

Reverse Beacon Network

- www.reversebeacon.net

Reverse Beacon Network Tutorial, Robert Capon W3DX, Feb 14, 2017

- <https://www.youtube.com/watch?v=-fwilBr1WoU>

N6TV's CW Skimmer Presentation at the 2015 Dayton Hamfest

- http://www.kkn.net/~n6tv/N6TV_Dayton_2015_CW_Skimmer.pdf

Northern California DX Foundation

- <http://www.ncdxf.org>

Thank You !

Backup